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## **Effect of *Salmonella typhimurium* on human cancer line tumors in mice**

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Research of bacteria-driven degeneration of tumor cells, initially pioneered by Dr William Coley in 1893 using heat-killed mixtures of streptococci, has led to the scrutiny of the enterobacteria species *Salmonella typhimurium* on various cancer lines since the mid-1990s. *Salmonella* is facultative anaerobe that typically causes enteritis in humans, but attenuated strains have been observed to specifically target cancer tissue when injected into the circulatory system of mammalian hosts. The LT2 (Lilleengan Type 2) *Salmonella* was isolated by Lilleengan in 1953 and was found to favor cancer cells and promote anti-tumor activity in 2005 (unpublished data). LT2 was the first *Salmonella typhimurium* to be sequenced, facilitating the creation of genomic microarrays that are currently being used to determine which genes are essential for tumor-killing mechanisms. Experimental Approaches: Therapeutic *Salmonella* has been developed and stored at the Cancer Research Center (CRC), which consists of approximately two thousand auxotrophic *Salmonella typhimurium* mutants stored in sealed stab vials for over 50 years at room temperature. Although therapeutic *Salmonella* has been shown to be effective against prostate cancer cell lines, little is known about the therapeutic breadth of *Salmonella* cancer therapy. Using tissue cultures, therapeutic *Salmonella* candidate CRC2631 will be tested on various human cancer cell lines. My studies will focus on colon cancer cell line HT29. Predicted Outcomes: *Salmonella* attachment and invasion of the HT29 cells is expected, which will be characterized by fluorescent microscopy time course experiment and gentamycin exclusion assays. Data from *Salmonella* attachment and invasion of prostate cancer lines will be used for comparison. Overall significance: The examination of salmonella-treated tumors will test the therapeutic range of CRC2631 *Salmonella* therapy, thus revealing what types of cancers can be effectively treated using therapeutic *Salmonella*. The nature (biological and chemical) of therapeutic *Salmonella* selection of the cancer cells can be determined through analysis of the mechanism of bacterial attachment or lack thereof, in addition to identification of molecules present or not present in the tested cancer cell lines that lead to the discrimination and destruction of cancer cells but not normal tissue.

This project was completed to fulfill a Capstone requirement.